

**CLARKS RIVER NATIONAL WILDLIFE REFUGE
APPROPRIATE USE and COMPATIBILITY DETERMINATION**

Refuge Use:

Use of Unmanned Aerial Systems / Drones (Special Use Permit only)

REFUGE NAME:

Clarks River National Wildlife Refuge, hereafter referred to as the Refuge, located in Marshall, Graves, and McCracken Counties in Kentucky.

ESTABLISHING AND ACQUISITION AUTHORITY(IES):

- (1) Migratory Bird Conservation Act {16 U.S.C. 715}
- (2) National Wildlife Refuge System Administration Act {16 U.S.C. 668(a)(2)}
- (3) Fish and Wildlife Act of 1956 {16 U.S.C. 742 (b)(1)}
- (4) Refuge Recreation Act {16 U.S.C. 460 K-1}
- (5) Executive Order 9670

REFUGE PURPOSE(S):

- (1) "...for use as a refuge and wildlife management area for migratory birds and other wildlife..." {Executive Order 9670, dated December 28, 1945}
- (2) "...for us as an inviolate sanctuary, or for any other management purpose, for migratory birds" {16 U.S.C. 715 (d), Migratory Bird Conservation Act}
- (3) "...for the development, advancement, management, conservation, and protection of fish and wildlife resources..." {16 U.S.C. 742 (b)(1)}
- (4) "...incidental fish and wildlife-oriented recreational development" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (5) "the protection of natural resources" {16 U.S.C. 460k-1; Refuge Recreation Act}
- (6) "the conservation of endangered or threatened species..." {16 U.S.C. 460k-1; Refuge Recreation Act}

NATIONAL WILDLIFE REFUGE SYSTEM MISSION:

The mission of the Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

DESCRIPTION OF USE:

(a) *What is the use?*

This use is the remote piloting of an unmanned aerial vehicle for use to observe wildlife, take photos/videos, record events for educational materials, inventory and monitoring, and/or research.

(b) *Where would the use be conducted?*

The use will be conducted within the refuge's boundary and be reviewed on a case-by-case basis to ensure this use does not have the potential to disturb wildlife, impact refuge management, or interfere with scheduled programs.

(c) *When would this use be conducted?*

This use would be conducted year-round in areas open to the general public from sunrise to sunset. Exceptions could be requested to use this technology within closed areas of the refuge and be reviewed on a case-by-case basis to ensure this use does not have the potential to disturb wildlife, impact refuge management, or interfere with scheduled programs.

(d) *How would this use be conducted?*

Only unmanned aerial systems that are in support of conservation, Refuge purposes, the Refuge System mission, or for educational and interpretation purposes will be permitted. Requests that do not directly support these will be considered on a case-by-case basis.

Each request for this use for scientific data collection or for environmental education will be considered, and if appropriate, will be issued a special use permit (SUP) by the refuge manager. Each request must be presented in writing with details of who, what, where, when, why, and how the commercial operation will be conducted. Each request will be evaluated on its own merit. The refuge manager will use professional judgment and ensure that the request will have no considerable negative impacts to natural, cultural, or visitor services, does not violate refuge regulations, and contributes to the achievement of the refuge purpose or the Refuge System mission. Any approved SUP will outline the framework in which the use can be conducted and refuge staff will ensure compliance with the permit.

Permittee shall provide a detailed description of filming/photography plans, including site specific location, support equipment, number of persons involved, client name, description of the project theme and key messages, and other details that would allow for evaluation of the project. Additionally, the permittee must provide advance copies of the FAA-approved Certificate of Authorization (COA) or Section 333 Exemption, other mission-related documents including but not limited to plans, logs, reports, and publications, pictures and specs of the specific UAS platform employed, and Aviation Risk Management or Aviation Project Safety document shall be provided to the Project Leader. Before a refuge manager can consider permitting the use of a drone and prior to bureaus approving/issuing a special use permit for this type of mission the operator must be in compliance with the following FAA regulations:

- DOI operator follows provisions of the Small UAS Rule (sUAS rule; Part 107), a COA, an emergency COA, or the DOI-FAA MOA
- Non-DOI government agency/public university operator follows provisions of the sUAS Rule Part 107) or a COA (and provides a copy of COA to USFWS)
- Commercial operator follows provisions of the sUAS Rule (Part 107)

In addition to the FAA requirements, the operator must ensure they met all 50 CFR regulations regarding aircrafts. Once the operator has met all required regulations, then the permit may be issued on a case-by-case basis to ensure this use does not have the potential to disturb wildlife, impact refuge management, or interfere with scheduled programs.

The special use permit will detail who, what, where, when, why and how the operation will be conducted. The refuge will manage this activity within the existing priority public uses (photography, environmental education, and scientific research) in accordance with Federal and State regulations and review it annually.

(e) *Why is this use being proposed?*

This use is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 Act of (16 1997. u.s.c: 668dd-668cc) as amended by the National Wildlife Refuge System Improvement Act of 1997. This activity however, can be linked to three of the six priority public uses: photography, environmental education and interpretation. This use has the potential to assist in scientific research, and Refuge Management actions such as inventory and monitoring. Clarks River NWR 2012 Comprehensive Conservation Plan (CCP) Goal D – Objectives D-7 specifically relates to promoting Special Uses such as biking and horseback riding on Clarks River NWR when appropriate and compatible. Clarks River NWR is recognized as a top priority refuge in connecting people with nature in the 2016 "Focusing Where It Matters Most" - A Plan to Further Align our workforce in Support of Priorities. Additionally, the Southeast Regional Priorities is to accomplish the US FWS mission by "connecting with people to inspire value, support, enjoy and benefit from the fish and wildlife resources and their habitats". The Southeast Regional Priorities continues to state:

"We will promote hunting, fishing, wildlife observation, and nature photography as a means to connect people with nature and provide for sustainable resource utilization. Similarly, we will encourage environmental education programs and interpretive resources to raise awareness of our mission, how we implement it, and how it benefits the public. We must continue to expand on existing and seek out new outreach efforts and recreational opportunities in order to remain relevant to the American people and generate the appreciation and enthusiasm that is needed to fuel the next generation of conservationists."

Therefore, although this use is typically not undertaken to benefit Refuge natural and cultural resources, it obviously provides participants an appreciation, or at least exposure to outdoor environments, and may provide a stronger connection to the Refuge and the mission of the FWS with specific parameters set to minimize disturbance of wildlife and visitors.

Under 50 CFR regulations for photography and filming, those required to obtain a special use permit for such commercial activities must pay a fee and agree to reimburse the government for any costs it incurs. An example of a case where this use could be considered is if this use is found to cause less potential disturbance of wildlife and less trampling of vegetation than allowing a film crew into certain areas of the Refuge. Specific policies have not been developed for this use in regard to environmental education/interpretation, scientific research, nor Refuge management. This use could assist Clarks River NWR in development of environmental education and interpretation materials. This use could also record certain Refuge events adding a new dimension to the Refuge's ability to connect with people through social media eg. facebook, twitter, and other websites. As new technologies are developed, this use could also assist in scientific research, and Refuge management such as inventory and monitoring, insect or beaver damage detection, storm damage detection, wildfire detection, invasive species detection, documentation of habitat management activities, and other habitat management activities. Under very

limited and controlled circumstances, allowing this use could expand the Refuge's ability to connect with an ever growing technological public.

AVAILABILITY OF RESOURCES:

Resources involved in the administration and management of the use includes personnel time associated with administration and law enforcement. Existing staffing and funding are adequate to support these activities.

No special equipment, facilities, or improvements are necessary to support the uses. Maintenance costs are not directly attributable to these incidental uses on the refuge.

Minimal costs are associated with these uses to monitor consequences of public having access to the refuge, such as degree of littering and vandalism. Plants and wildlife will be monitored to determine any impacts as a result of public use.

A special use permit is required, which obligates administrative time to complete. However, a fee could be charged to off-set this cost.

ANTICIPATED IMPACTS OF THE USE:

Flying aircraft over or near wildlife can create stress that may cause significant harm and even death. Intentional disturbance of wildlife during breeding, nesting, rearing of young or other critical life history functions cannot be tolerated and would be in violation of 50 CFR 27.34 and 27.51.

Aerially sourced data collection may be critical to the future understanding of many ecological systems, such as the use of remotely sensed satellite imagery to investigate the impacts of climate change or the migration changes of species ([Bartlam-Brooks et al., 2013](#); [Blanco et al., 2008](#); [Felix, 2000](#); [Mueller et al., 2011](#); [Roshier & Rumbachs, 2004](#)) or estimating population sizes using aerial photography ([Bako, Tolnai & Takacs, 2014](#); [Trathan, 2004](#)). Unmanned aerial systems (UAS or drones) are increasingly being tested or used as wildlife management tools across the globe ([Goebel et al., 2015](#); [Hodgson et al., 2013](#); [Koh and Wich, 2012](#); [Mu lero-Pazmany et al., 2014](#); [Sarda-Palomera et al., 2011](#)) which informs current understanding of the effects of these systems on birds. The application of UAVs for wildlife surveys is a rapidly advancing field and in 2015 alone there have been several studies that have attempted to quantify the response of animals in wild situations to the presence of an overhead UAV ([Chabot, Craik & Bird, 2015](#); [Ditmer et al., 2015](#); [Goebel et al., 2015](#); [Pomeroy, O'Connor & Davies, 2015](#); [Vas et al., 2015](#)). In the studies published to date that have examined this question, researchers have often relied on a single type of UAV (typically a small multirotor model) without comparing potential disturbance effects of the different fixed wing and multi-rotor UAVs that are commercially available. Given the different acoustic profiles, flight patterns and shape of available platforms, it would be unwise to extrapolate a focal species' response or tolerance between different models of UAVs, such as multirotor versus fixed wing configurations, as animals may react very differently to each type.

However, an advantage of UAVs is that the aerial photography based approach provides a bank of images from which individual species can be independently counted, verified and archived for future analysis or audit. This transparent census technique can increase the usability and cost effectiveness of information gathered if images are made available to other researchers. Temporary disturbance to wildlife, specifically birds, exist during the UAS flight period. Vas et al. (2015) studied the behavioral effects of a quadri-copter drone on mallards (*Anas platyrhynchos*), flamingos (*Phoenicopterus roseus*), and common greenshanks (*Tringa nebularia*). The birds had no significant reactions to different drone speeds or

different colored drones, and it appeared to be no cumulative effects of successive flights. These species had very little reaction to lower approach angles, but consistently reacted when the drones approached from directly overhead. These results are consistent with those of Sarda-Palomera et al. (2011) who monitored the effects of UAS used for population monitoring of gulls; and with results of Goebel et al. (2015) who found no reaction among penguins or seals when UAS were used for population monitoring. However, more powerful drones of larger size that make more noise may have a greater effect on birds and other wildlife.

Although research is limited on the impacts of drones or unmanned aircraft known as Unmanned Aerial Systems (UAS), the Service has an internal website (<https://sites.google.com/a/fws.gov/region-1-unmanned-aerial-systems-uas-resource-guide/wildlifedisturbance>) that lists existing research dealing with wildlife disturbance and drones that was considered in this determination, as well.

PUBLIC REVIEW AND COMMENT:

The compatibility determination for Clarks River National Wildlife Refuge was made available for public review and comment for 30 days beginning February 15, 2017 and ending March 16, 2017. Announcements were made in the *Marshall County Daily*, *Paducah Sun*, *Lake News* and posted on the Refuge's website and facebook pages. Due to changes to this compatibility determination, it was determined that the public should have an additional chance to comment. Therefore, this compatibility determination was made available for public review and comment for 14 days beginning March 14, 2018 and ending March 28, 2018. Announcements were once again sent to local newspapers and posted on the Refuge's website and facebook pages

DETERMINATION (CHECK ONE BELOW):

- ☐ Use is not compatible
- ☒ Use is compatible, with the following stipulations

NEPA Compliance for Refuge Use Description: *Place an X in appropriate space.*

- ☐ Categorical Exclusion without Environmental Action Statement
- ☒ Categorical Exclusion and Environmental Action Statement
- ☐ Environmental Assessment and Finding of No Significant Impact
- ☐ Environmental Impact Statement and Record of Decision

These compatibility determinations can be categorically excluded from further NEPA analysis under 40 CFR §1508.4, 516 DM 8.5(A)(1), 516 DM 8.5(B)(7), 516 DM 8.5(B)(9), and 516 DM 8.5(C)(5). Further, these actions do not trigger an extraordinary circumstance as outlined under 43 CFR §46.215. These uses are consistent with the 2012 Comprehensive Conservation Plan and associated Environmental Assessment (USFWS 2012) and Finding of No Significant Impact (USFWS 2012) for Clarks River NWR. Environmental conditions have not changed substantially since that analysis. This compatibility determination updates and replaces previous compatibility determinations.

STIPULATIONS NECESSARY TO ENSURE COMPATIBILITY:

To ensure compatibility with refuge purposes and the mission of the Refuge System, the following refuge-specific stipulations are examples which may be required by the Special Use Permit:

(1) This use must be conducted in accordance with applicable State and Federal laws and regulations related to the use of UAS including but not limited to USFWS 603 FW 1 (Appropriate Use), 50 CFR 27.34 (Harassment of Wildlife), 14 CFR 21, 43, 61, 91, 101, 107, 119, 133, and 183 and other applicable laws, regulations and policies, as well as, FWS and special refuge specific regulations.

(2) The public use program will be reviewed annually to ensure that it contributes to refuge objectives in managing quality recreational opportunities and protecting habitats, and is subject to modification if on-site monitoring by refuge personnel or other authorized personnel results in unanticipated negative impacts to natural communities, wildlife species, or their habitats. Refuge law enforcement officer(s) will promote compliance with refuge regulations, monitor public use patterns and public safety, and document visitor interactions. Refuge law enforcement personnel will monitor all areas and enforce all applicable State and Federal regulations.

(3) Areas may be closed on the refuge to protect resources or prevent unwanted disturbance.

(4) The public will not be allowed to fly their own UASs; only special use permitted UASs are authorized for use to observe wildlife, take photos/videos, record events for educational materials, inventory and monitoring, and/or research.

(5) If disturbance of wildlife is noticed, the operator will cease and desist the flight.

JUSTIFICATION:

The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, provides guidelines and directives for administration and management of all areas in the National Wildlife Refuge System, which includes "wildlife refuges, areas for the protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas." In managing the National Wildlife Refuge System, the U.S. Fish and Wildlife Service (Service) must "assure that any present or future recreational use will be compatible with, and will not prevent accomplishment of, the primary purposes for which ... conservation areas were acquired or established" Congress has authorized the Secretary of the Interior "to administer such areas or parts thereof for public recreation when in his judgment public recreation can be an appropriate incidental or secondary use" Thus, national wildlife refuges are considered "closed" to recreational uses unless and until a Refuge Manager makes a positive compatibility determination.

"All national wildlife refuges are maintained for the primary purpose of developing a national program of wildlife and ecological conservation and rehabilitation." Pursuant to its authority to limit recreational use of areas within the National Wildlife Refuge System, the Service has promulgated regulations which prohibit refuge visitors from engaging in certain activities on refuge lands. Specific regulations that apply to the aforementioned determination include:

1) 50 C.F.R. § 27.34 prohibits "[t]he unauthorized operation of aircraft, including sail planes, and hang gliders, at altitudes resulting in harassment of wildlife, or the unauthorized landing or take-off on a national wildlife refuge, except in an emergency, is prohibited." Importantly, there is no definition of "aircraft" in the National Wildlife Refuge System regulations at 50 C.F.R. Chapter I, Subchapter C, which covers the National Wildlife Refuge System. However, the term is defined in 50 C.F.R. Chapter I, part 10, Subpart B. where "aircraft" is defined as "any contrivance used for flight in the air." This definition is consistent with Webster's Dictionary (2013) definition of

"aircraft" as "any machine supported for flight in the air by buoyancy or the dynamic action of air on its surfaces, especially powered airplanes, gliders, and helicopters."

Thus, the common meaning of the term aircraft is broad enough to include manned and unmanned aircraft.

2) 50 C.F.R. § 27.51 prohibits "[d]isturbing, injuring, spearing, poisoning, destroying, collecting or attempting to disturb, injure, spear, poison, destroy or collect any plant or animal on any national wildlife refuge ... except by special permit. ... "

3) While 50 C.F.R. § 26.32 permits recreational uses, including "nature observation and photography" on refuge lands, but only after a finding by each Refuge Manager that the recreational uses are compatible with the purposes of that particular refuge. Visitors to refuge lands using unmanned aircraft while engaging in "commercial filming and still photography" must satisfy all applicable permit requirements set forth at 43 C.F.R. § 5.1, and failure to do so is a violation of 50 C.F.R. § 27.71. 43 C.F.R. § 5.12 defines "commercial filming" as "the ... recording of a moving image by a person, business, or other entity for a market audience with the intent of generating income." Under these regulations, those required to obtain a permit for such commercial activities must pay a fee and agree to reimburse the government for any costs it incurs.

The use of drones/UASs also is not consistent with goals and objectives of these refuges as identified in the CCP /HMPs' which focus on migratory birds, at risk species, and threatened and endangered species. This use is not a priority public use of the National Wildlife Refuge System under the National Wildlife Refuge System Administration Act of 1966 Act of (16 1997. u.s.c: 668dd-668cc) as amended by the National Wildlife Refuge System Improvement Act of 1997. This activity, however, can be linked to three of the six priority public uses: photography, environmental education and interpretation. This use has the potential to assist in scientific research, and Refuge Management actions such as inventory and monitoring.

Approving this use would not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the Refuge, nor would this use materially interfere with or detract from the purposes of the Refuge, nor cause an undue administrative burden. Whether unmanned aerial systems are used for photography, environmental education/interpretation, Refuge management actions, or scientific research, the Refuge manager must ensure this use does not have the potential to disturb wildlife, impact refuge management, or interfere with scheduled programs. Each request for this use will be considered on a case-by-case basis.

Approval of Compatibility Determinations

The signature of approval is for the compatibility determinations above for Clarks River NWR. If one of the descriptive uses is considered for compatibility outside of this package, this approval signature becomes part of that determination.

APPROVAL FOR COMPATIBILITY DETERMINATION:

Refuge Manager: _____
(Signature) (Date)

Regional Compatibility

Coordinator: _____

(Signature)

(Date)

Area Supervisor: _____

(Signature)

(Date)

Regional Chief, National

Wildlife Refuge System

Southeast Region: _____

(Signature)

(Date)

Literature Cited

Bako, Tolnai & Takacs (2014) Bako G, Tolnai M, Takacs A. Introduction and testing of a monitoring and colony-mapping method for waterbird populations that uses high-speed and ultra-detailed aerial remote sensing. *Sensors*. 2014;14:12828–12846. doi: 10.3390/s140712828.

Bartlam-Brooks et al. (2013) Bartlam-Brooks HLA, Beck PSA, Bohrer G, Harris S. In search of greener pastures: using satellite images to predict the effects of environmental change on zebra migration. *Journal of Geophysical Research: Biogeosciences*. 2013;118:1427–1437. doi: 10.1002/jgrg.20096.

Blanco et al. (2008) Blanco PD, Rostagno CsM, Del Valle HcF, Beeskow AM, Wiegand T. Grazing impacts in vegetated dune fields: predictions from spatial pattern analysis. *Rangeland Ecology & Management*. 2008;61:194–203. doi: 10.2111/06-063.1.

Chabot, Craik & Bird (2015) Chabot D, Craik SR, Bird DM. Population census of a large common tern colony with a small unmanned aircraft. *PLoS ONE*. 2015;10:e1831 doi: 10.1371/journal.pone.0122588.

Ditmer et al. (2015) Ditmer MA, Vincent JB, Werden LK, Tanner JC, Laske TG, Iaizzo PA, Garshelis DL, Fieberg JR. Bears show a physiological but limited behavioral response to unmanned aerial vehicles. *Current Biology*. 2015;25:2278–2283. doi: 10.1016/j.cub.2015.07.024.

Felix (2000) Felix NK. Satellite-observed sensitivity of world land ecosystems to El Niño/La Niña. *Remote Sensing of Environment*. 2000;74:445–462. doi: 10.1016/S0034-4257(00)00137-1.

Goebel et al. (2015) Goebel ME, Perryman WL, Hinke JT, Krause DJ, Hann NA, Gardner S, LeRoi DJ. A small unmanned aerial system for estimating abundance and size of Antarctic predators. *Polar Biology*. 2015;38:619–630. doi: 10.1007/s00300-014-1625-4.

- Hodgson, Kelly & Peel (2013) Hodgson A, Kelly N, Peel D. Unmanned Aerial Vehicles (UAVs) for surveying marine fauna: a dugong case study. PLoS ONE. 2013;8:e1831 doi: 10.1371/journal.pone.0079556.
- Koh & Wich (2012) Koh LP, Wich SA. Dawn of drone ecology: low-cost autonomous aerial vehicles for conservation. Tropical Conservation Science. 2012;5:121–132.
- Mueller et al. (2011) Mueller T, Olson KA, Dressler G, Leimgruber P, Fuller TK, Nicolson C, Novaro AJ, Bolgeri MJ, Wattles D, DeStefano S, Calabrese JM, Fagan WF. How landscape dynamics link individual- to population-level movement patterns: a multispecies comparison of ungulate relocation data. Global Ecology and Biogeography. 2011;20:683–694. doi: 10.1111/j.1466-8238.2010.00638.x.
- Mulero-Pazmany, M., R. Stolper, L.D. van Essen, J.J. Negro, and T. Sassen. 2014. Remotely piloted aircraft systems as a rhinoceros anti-poaching tool in Africa. PLoS ONE 9: e83873. doi:10.1371/journal.pone.0083873
- Pomeroy, O'Connor & Davies (2015) Pomeroy P, O'Connor L, Davies P. Assessing use of and reaction to unmanned aerial systems in gray and harbor seals during breeding and molt in the UK. Journal of Unmanned Vehicle Systems. 2015;3:102–113. doi: 10.1139/juvs-2015-0013.
- Roshier & Rumbachs (2004) Roshier DA, Rumbachs RM. Broad-scale mapping of temporary wetlands in arid Australia. Journal of Arid Environments. 2004;56:249–263. doi: 10.1016/S0140-1963(03)00051-X.
- Sarda-Palomera et al. (2012) Sarda-Palomera F, Bota G, Vinolo C, Pallares O, Sazatornil V, Brotons L, Gomariz S, Sarda F. Fine-scale bird monitoring from light unmanned aircraft systems. Ibis. 2012;154:177–183. doi: 10.1111/j.1474-919X.2011.01177.x.
- Trathan (2004) Trathan PN. Image analysis of color aerial photography to estimate penguin population size. Wildlife Society Bulletin. 2004;32:332–343. doi: 10.2193/0091-7648(2004)32[332:IAOCAP]2.0.CO;2.
- Vas et al. (2015) Vas E, Lescroel A, Duriez O, Boguszewski G, Gremillet D. Approaching birds with drones: first experiments and ethical guidelines. Biology Letters. 2015;11 doi: 10.1098/rsbl.2014.0754. 20140754–20140754.